Frankly Speaking

Federal-Aid Bills

THE construction of rural and urban highways will provide one of the major means of providing employment in the post-war period. However, unless the states and local authorities have an adequate shelf of plans for road projects which can be placed under contract during the reconversion period, highway construction by private contract may fail to provide sufficient jobs. In such event, there is danger that we may have another government "make-work" program.

In order to plan adequately and sufficiently in advance for a sound post-war highway program, state and local authorities must know without delay what the national policy regarding Federal-aid for highways is to be. The Legislatures of 45 states will meet in 1945 and they must pass legislation enabling the state and local officials to meet the Federal-aid requirements.

In this issue appears a discussion of the two bills providing for Federal-aid for post-war highways introduced in Congress. One of these, the Hayden Post-War Highway Bill (S. 2105) passed the Senate on September 15. A similar bill in the House by Representative Robinson of Utah (S. R. 4915), will not be considered until after the November election.

The principal point of difference between the two bills is in the method of apportionment of funds to the states. Differences of opinions among state officials as to the method of apportionment are largely responsible for the delay in this important legislation. It is to be hoped that these differences can be compromised so that the threat of delay in the post-war highway program will be removed.

Both the Senate bill and the House bill contain a provision requiring the use of approved traffic control devices on Federal-aid and highway projects *which is of particular interest to every traffic engineer.* This provision is as follows:

"On any highway or street hereafter constructed with Federal-aid in any State, the location, form, and character of informational, regulatory and warning signs, curb and pavement or other markings, and traffic signals installed or placed by any public authority, or other agency, shall be subject to the approval of the State highway deparment with the concurrence of the Public Roads Administration; and the Commissioner of Public Roads is hereby directed to concur only in such installations as will promote the safe and efficient utilization of the highways."

Every traffic engineer will applaud this recognition of the importance of the part traffic engineering plays in providing safe and efficient transportation facilities.

Henry E. Riegel

Member, Board of Direction

Fingerprinting State Highways For Safety

by BRYAN WILSON

UNTIL the idyllic day is reached when our state highways all are converted into "limited ways," traffic engineers will be obliged to constantly fight the four basic traffic frictions which are acknowledged to be the causes of all motor vehicle traffic accidents.

Obviously, considering the traffic engineer as a road doctor, a diagnosis of an offending road is necessary in order to prescribe a remedy. The value of a systematic check on the roads of a highway system by a comparative method that will show the degree of "illness" of each individual road can, therefore be very valuable.

A New Formula

After three years of research, we believe that a system we have devised for determining what we call the *Accident - Expectancy Coefficient* for Kansas highways can be used successfully in other states. By the use of this system it is possible to predict with reasonable accuracy just where to anticipate most accidents and to determine the approximate rate of occurrence.

As a prelude to an explanation of the system we are using in an effort to fingerprint our highways for safety, it is necessary to understand the philosophy that led to its conception. First, we hold that no accident *happens,* and this leads us logically to conclude that all accidents are *caused,* which is our first premise; second, we feel that accidents are caused by factors which may be partially listed in three main groups:

1. *accident-provoking road* factors;
2. *human* factors;
3. *mechanical* failures.

We believe that group 1 is a function of road design, construction and maintenance, and that it is a monument emphasizing and commemorating the errors of highway engineers in the past, as well as some of our engineers of the present who blithely continue to build into roads trouble for traffic engineers of the future. These errors, of course, include improper alignment, one - lane bridges, bridges on a skew, horizontal curves at the foot of sharp vertical curves, intersecting roads too near the crest of a hill, lack of proper sight distance, lack of channelization by means of center lines, islands, and so on, *ad infinitum.*

Group 2 we regard as the most unstable factor of all, the mentality, reactions, sobriety, age, emotional stability, experience, physical handicaps and sex of individual drivers, all differing greatly.

Group 3 is almost a negligible factor, but may be broken down to include type of vehicle, brakes, alignment of wheels, lights, steering apparatus, etc.

We believe also, that we may assume the following: (a) that we may work toward ideals, but that we must live with conditions as they now exist; (b) that always we shall have with us on the highways both good and bad drivers with varying degrees of human frailties; (c) that a given

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number of drivers will have fewer accidents on roads that approach the ideal, e.g., with no ingress or egress except at long intervals, with medial dividers, with grade separations, with accelerating and decelerating lanes, with no curves, and with smooth surfaces; (d) that if there were no signs at all to warn, guide or control traffic, accidents would increase in ratio to the number and degree of road hazards.

The Accident-Provoking Unit

The above reasoning, which we believe to be basically sound, leads us to conclude that roads having more physical hazards may normally be expected to have more accidents. In order to fingerprint each road in its relation to another road, we feel that it is necessary to use a yardstick common to all. The term "Accident-Provoking Unit" has been selected and defined as the smallest type of possible hazard occurring on a highway. A deviation from a tangent, or an easy curve with adequate sight distance are worth one unit each. Other hazards are given values dependent, more or less, on an ascending scale of their power to cause accidents.

The following is a list of possible accident-provoking physical factors of a road and the value in A.P.U.'s (Accident Provoking Units) which we have assigned to them:

No.	*Type of Hazard*	*Value in A.P.U.'s*
1.	An easy curve with adequate sight distance	1
2.	An easy curve with partial sight distance	2
3.	A sharp curve with adequate sight distance	2
4.	A sharp curve with partial sight distance	4
5.	An easy curve with adequate sight distance at the foot of a vertical curve	4
6.	An easy curve with partial sight distance at the foot of a vertical curve	8
7.	A sharp curve with adequate sight distance at the foot of a vertical curve	16
8.	A sharp curve with partial sight distance at the foot of a vertical curve	32
9.	A vertical curve that limits sight distance to less than 650 feet	16
10.	An unsignalized railroad crossing at angle of more than 45 degrees, sight distance over 1000′	8
	(less than 500′ sight distance)	16
11.	An unsignalized railroad crossing at angle of less than 45 degrees, sight distance over 1000′	18
	(less than 500′ sight distance)	24
12.	Any narrow bridge with less than 500′ of tangent on both sides	8
13.	Any narrow bridge on curve	24
14.	Any one-lane bridge with less than 500′ of tangent on both sides	24
15.	Any one-lane bridge on curve	32
16.	An intersection with less than 300′ sight distance	8
17.	Any hole or corrugation in surface of road capable of causing car to swerve	8
18.	Any intersecting road near the crest of a hill	16
19.	Underpass on tangent with overhead road's supporting column in center of road	16
20.	Underpass with column in center of road on curve	32
21.	Traffic count of 1000 or less	4
22.	Traffic count of 2000	16
23.	Traffic count of 3000	64
24.	Traffic count of 4000	256
25.	Two hazards in series, ½ their individual sums squared.	

We have other combinations too numerous to list, but the above is a general idea. Whether or not these assigned values are followed is immaterial. The important thing is to have a measuring stick to compare road hazards.

Using the Formula

With a car and an A.P.U. index on your pad, it is possible to make a surprisingly accurate survey of a road very quickly. We have logged as much as two hundred fifty miles in a day. After the road is logged, it is desirable to draw a graph to convenient scale, breaking the road into lengths corresponding to maintenance sections, by surfaces, counties or other convenient breakdown. A series of peaks will indicate a danger area. It is amazing

how your accident spot map will back up your findings.

Naturally, for comparison purposes, it would be too long a task to count all your A.P.U.'s to determine the standpoint, so, to offset that task, we have devised the following empirical most dangerous road from a physical formula for determining the Accident-Expectancy Coefficient, abbreviated A.E.C.

$$\text{A.E.C.} = \text{The fourth root of } \frac{(A - CW)}{S}$$

where A equals average number of A.P.U.'s per mile: C equals 24-hour traffic count; W equals 11 minus width of one lane: S equals condition of surface, rated as 1, 2, or 3, (bad, fair, good).

The A.E.C. of each road can be compared quickly. The question as to where to spend money for maintenance or construction (leaving out politics) is quickly determined. Arguments are eliminated, and the facts presented supercede mere opinions.

New York's New Union Truck Terminal

THE Port of New York Authority is acquiring the site in downtown Manhattan on which it will build New York City's first union motor truck terminal.

The structure, a thousand feet long and 175 feet wide, will be the largest union truck freight station in the country. It will extend from Washington to Greenwich Streets, and from Spring to Houston Streets, necessitating the closing of Charlton and King Streets, between Greenwich and Washington Streets.

Benefits

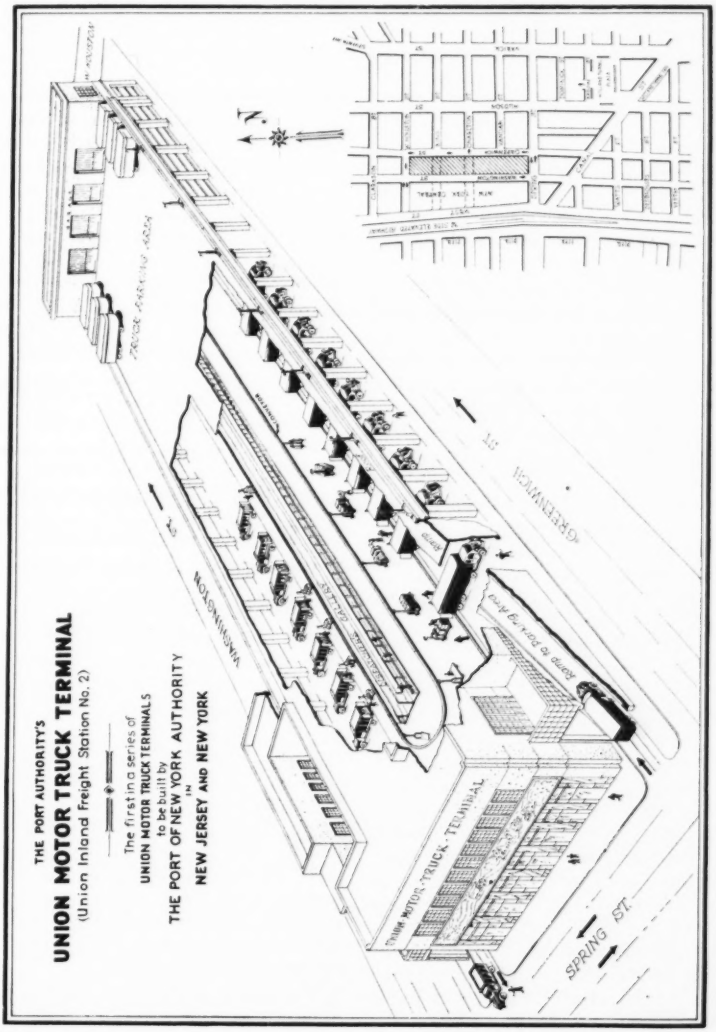
The Port Authority's Union Motor Truck Terminal will expedite the handling of less-truckload freight, reduce street traffic congestion and lower local trucking and terminal costs for over-the-road common carriers.

The new terminal will save an estimated 5c per 100 lbs. of goods handled. Over-the-road truck mileage will be cut from 2,100,000 miles to 945,000 miles, an annual saving of 1,155,000 truck miles, while local truck mileage will be reduced from 1,836,000 miles to 1,161,000 miles, a saving of 675,000 truck miles per year.

The Manhattan Union Truck Terminal will be the first in a series of union truck freight stations to be built by the Port Authority in New Jersey and New York. The Port Authority is convinced that there is a definite need for union motor truck terminals in nothern New Jersey, but has not yet assembled the data necessary to determine the most desirable specific locations. A suggestion has been that a large single union terminal be established in the Meadows to serve the entire area. There have been other suggestions that several are needed, possibly one in the Jersey City area, one in the Newark - Elizabeth area, and one in the Paterson-Passaic or Bergen County area. For that reason a survey is now under way in which over-the-road carriers operating in northern New Jersey, and fourteen

Chambers of Commerce, are cooperating with the Port Authority to determine the pattern of distribution of miscellaneous motor truck freight in that area. As soon as the survey is completed recommendations will be made for action on a program of union motor truck terminals in that section of the Port District.

Estimated to cost two and a half million dollars, the Manhattan Union Motor Truck Terminal will be built as soon as materials can be made available. The project will require approxi-



mately 400,000 man-hours of labor, and will be ready for operation about a year after ground is broken. An operating staff of about 150 will be employed in the terminal.

The Port Authority's terminal will provide facilities for a substantial number of over-the-road carriers who now operate their own individual terminals. With off-the-street bays for 136 trucks, it will be capable of handling about 1,600 tons of merchandise freight in a work-day of two eight-hour shifts, or in excess of 2,000 tons on a 'round-the-clock basis. The freight may include anything from hairpins to airplane motors, or from food to wire or textiles.

The Structure

The primary structure of the terminal will be a first-floor freight platform 800 feet long and 80 feet wide. It will be equipped with an overhead mechanical circular chain conveyor serving both sides of the island platform. This conveyor will tow platform trailers and enable most of the freight to be handled on wheels. There will be 500 such trailers, as well as two cranes for heavy pieces.

On the first floor there will also be ample space for temporary storage of export, damaged and valuable freight, a service station and restaurant. For the convenience of truckmen there will be a comfortably furnished rest room with showers and first-aid equipment.

One-way ramps and stairways will lead to the second floor where a third of the space will be roofed to provide offices for the trucking companies. Except for a repair shop adequate to care for the equipment using the terminal, the remainder of the roof will be available for the parking of as many as 128 complete tractor-trailer units. This parking facility will take off the street all vehicles using the terminal. The space could be adapted as a freight helicopter landing deck, if demand should develop for such service. The restaurant, repair shop and service station will be leased as concessions.

Existing Terminals Inadequate

The building of this Union Truck Terminal by the Port Authority is the first recognition by a public agency of the need for providing union terminal facilities for the rapidly growing motor truck transport industry. Approximately two-thirds of the merchandise freight now entering and leaving the Port of New York Authority District is carried by trucks over the highways. Existing truck terminals in this area are inadequate in size, and are neither unified nor coordinated. The Union Motor Truck Terminal will help relieve the major public problem of street congestion, and it will also help prevent increases in truck freight rates that would penalize business and labor in the Port District.

The union station will permit motor truck lines to interchange freight directly across a common platform rather than incur double handling and intermediate street trucking between their individual terminals as they do today. It is estimated that rehandling of freight will be held to 15 per cent, an increase in efficiency of 25 per cent over any terminal now in operation. It will also furnish local shippers and receivers with a freight station platform at which they can pick up and deliver consolidated consignments from many over-the-road carriers with their own local city trucks. The Union Motor Truck Terminal will make it possible for the so-called "mosquito fleet" to operate pickup and delivery service with efficiently routed, consolidated loads between the terminal and steamship piers and shippers' places of business.

The Port Authority's first Union Motor Truck Terminal is ideally lo-

cated. Manhattan south of 59th Street is the center of the greatest miscellaneous freight density in the Port District, and the downtown terminal will provide convenient access to store doors in this section. It is a few blocks from the Holland Tunnel, and close to the main north and south trucking artery on the west side. It is near the point where the West Side Highway would be extended going south to the Battery-Brooklyn Tunnel. Any future crosstown highway will have an entrance close to the Terminal, and it is convenient to steamship piers.

The Union Motor Truck Terminal is the second union freight station initiated by the Port Authority. The first was the Union Inland Freight Station No. 1, opened in 1932 in The Port of New York Authority Building which extends from Eighth to Ninth Avenue between Fifteenth and Sixteenth Streets. This terminal is operated jointly by the eight trunkline railroads for railroad less-carload freight. More than 140,000 tons of such freight were handled in this terminal last year at a saving to the shippers of approximately a dollar a ton.

This article was prepared for TRAFFIC ENGINEERING by The Port of New York Authority.

Plans for Postwar Safety

by H. G. SOURS

THE current wartime condition of motor vehicles and tires, coupled with unavoidable deterioration of streets and highways, has brought two post-war traffic problems sharply into focus. The first of these involves the removal of wartime restrictions on motor vehicle operation, and the second is a problem which will confront us when normal traffic conditions return, and new vehicles and tires become a reality.

Immediate Problem

The immediate post-war period, which will bring a rather sudden lifting of wartime restrictions, will also bring a sharp rise in accidents, particularly in the more severe types. Speeds will increase. Many vehicles and many more tires will be unsafe at high speeds and drivers too may show the effects of wartime strain and lack of regular driving.

Enforcement, education, and engineering each will have responsibilities in solution of this immediate problem, but the latter two activities, particularly education, take time. Consequently, in this first period, as far as public agencies are concerned, enforcement will play a major role in meeting the problem of traffic safety.

Long Range Problem

The second problem will come into prominence after traffic volumes and related factors return to normal. When we realize that most drivers are amateurs as compared with the highly skilled and selected personnel charged with the operation of other land, sea and air craft, the need for building safety into highways is apparent. This is an engineering task. Multiple-lane, divided highway construction, with limited access features on heavily traveled routes, will be required. Use

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Condensed from a paper given by H. G. Sours, Director of the Ohio Department of Highways, at the Institute of Traffic Engineers Annual Meeting, October 1 to 4, 1944, Chicago, Illinois. The author is also Regional Vice President, American Association of State Highway Officials.

of uniform devices for traffic control will lessen confusion and hence tend to increase safety. Special pedestrian facilities, regulation of parking, provision of adequate surface widths and numerous minor physical treatments also will be important engineering contributions.

Traffic Engineering Bureaus

A highway department should have a traffic engineering bureau or division where matters relating to highway traffic control and safety are given special consideration. A number of state highway departments have made progress in this direction but until rather recently such bureaus have been concerned almost exclusively with signs, signals and markings and the treatment of dangerous locations. Now the progressive departments are beginning to coordinate the work of the traffic engineering bureau with that of other bureaus, particularly design. The researches carried on by the traffic engineering bureau in connection with traffic performance, terminal and parking facilities, roadway capacity and similar problems constitute an excellent background for recommendations as to geometric design features not only under standard conditions but for special problems as well.

Traffic control is normally a function of the traffic engineering bureau. This involves the application of regulatory measures and the prescribing of corrective treatment for existing facilities. Traffic planning, which embraces problems of general location, capacity and traffic operation, is sometimes combined with traffic surveys of origin and destination, volume, accidents and similar research. On the other hand, in other highway departments there are separate bureaus, one for traffic engineering and one for the planning survey. In any event, the functions of these two must be definitely coordinated so that proper planning may result.

The traffic engineer can make a real contribution to highway safety. Through scientific analysis of available and collectible facts, safety can be integrated with the design of highways and through proper maintenance and sound regulation of traffic movement, a maximum in highway efficiency can be attained.

FOUR STATES HELP FINANCE LOCAL PLANS FOR POST-WAR PUBLIC WORKS PROJECTS

Four states—New York, California, Michigan and New Jersey—now give financial assistance to local governments for the preparation of plans and specifications for post-war public works, the American Public Works Association reports.

New York in 1943 was the first to provide such aid when the temporary state commission for post-war public works planning was granted $3,000,000 for state public works planning and grants to local agencies on a matching basis. The state pays one-half the cost of preliminary plans up to one-half of 1 per cent for the detailed plans if the total cost of planning does not exceed 2 per cent of the cost of construction.

The other three states entered the field this year. California appropriated $10,000,000 of which $7,000,000 is to be used for plans and specifications and $3,000,000 for site purchases. Assistance will be given local units through the state reconstruction and re-employment commission which was voted $100,000 recently to expand its staff and set up two regional offices.

Michigan appropriated $5,000,000 to defray one-half the cost of local public works planning. The Michigan planning commission receives and approves the applications of local governments for funds to defray the cost of surveys, plans and specifications.

The Michigan planning commission has issued a manual of procedures and urges that local communities evaluate projects by the need, the ability of the community to finance and support the improvement and the amount of employment to be provided.

New Jersey created a department of economic development to supervise allocations amounting to $500,000 to local governments for plans and specifications.

The Pending Federal Highway Program

SHORTLY before Congress recessed last September the Senate approved a Federal Aid highway bill (S 2105) which authorizes $450,000,000 for distribution to state highway departments for each of the first three postwar years.

When Congress returns (Nov. 14) prompt action will be taken on the pending House of Representatives highway bill (HR 4915), according to House leaders. Differences in the two bills are such that little delay is expected in final adoption.

S 2105

To speed highway planning, the Senate bill provides that 100 million dollars would be immediately available for the making of plans and surveys.

Funds for each year are distributed as follows:

200 million—projects on the Federal Aid primary highway system

125 million—projects on the Federal Aid primary system in urban areas

125 million—projects on secondary roads

This was prepared for TRAFFIC ENGINEERING Magazine by the Automotive Safety Foundation.

Recognizing the varied needs of the states, the Senate bill enables state highway departments to expend Federal Aid primary system funds either inside or outside urban areas. The Federal Aid primary system embraces 231,176 miles, about 8 per cent of the nation's highway mileage.

Funds earmarked for urban extensions on the Federal Aid primary system should greatly stimulate removal of long neglected bottlenecks and traffic hazards in urban areas.

Secondary Roads

A broader definition for secondary roads was injected into the bill by including farm-to-market roads, rural mail routes, school bus routes, and roads in cities below 5,000 population. Secondary funds, the bill provides, shall be spent on a system of roads selected by each state highway department in cooperation with local road authorities and the Commissioner of Public Roads. Through previous Federal Aid legislation, 10 per cent of the secondary roads are already eligible for Federal Aid. Under the Senate bill it is expected that this percentage will be at least doubled.

Provision is made for states such as Massachusetts and Connecticut, which operate their local governments on a town or township basis rather than by

municipal government, to disregard municipal boundary limitations, if the total density of the state population is more than 200 persons per square mile. Also where states control all public roads and highways, as in North Carolina and Delaware, secondary funds may be expended on the primary system if the state and Public Roads Administration agree.

Apportionment Formulae

Three formulae are established for the apportionment of the sums authorized for the three classes of roads and streets. The $200 million fund authorized for the Federal Aid primary system shall be apportioned among the states as provided in Section 21 of the 1921 Federal Highway Act. This is the original 1916 formula based equally on factors of land area, population and post road mileage in each state.

In apportioning the funds for extensions of the Federal Aid system in urban areas, one factor is used, urban population in communities of 5,000 or more. An urban area is defined as "an area including and adjacent to a municipality or other urban place, of 5,000 or more, as shown by the latest available Federal census". Boundaries of the urban area will be fixed by each state highway department, subject to Public Roads Administration approval. Urban areas are intended to include settled areas which exist around nearly all cities. This would relieve situations along principal highways where ribbon development has greatly restricted highway utility.

Secondary road money is apportioned under a modified formula: 1/3 on the basis of state area; 1/3 on the basis of rural population of the states; 1/3 on the basis of mileage of rural delivery and star routes of the state.

The bill provides that Connecticut and Vermont towns, because of their differences in organization of local government, are to be regarded as municipalities where population totals 5,000 or more.

The Senate bill adheres to the established matching basis, with the Federal government and local governments each bearing 50 per cent of the total cost of projects.

Grade Crossing Elimination

Not less than 10 per cent of the apportionment shall be available for railway grade crossing elimination projects. However, that is not a mandatory provision. It is required that railroads shall pay not less than 15 per cent of the total cost of grade crossing projects where Federal funds are used.

Interregional Highways

Designation of a system of interregional highways not exceeding 40,000 miles, is an outstanding provision of the Senate bill. This system would be so located as to connect the principal cities, to serve the national defense, and to connect with highways at the borders of neighboring counties. The routes would be selected by joint action with the state highway department of each state in conjunction with the adjacent states, as provided in the Act of 1921 establishing the Federal Aid primary highway system.

It is expected that the selection of this system will follow in general the pattern recommended by the Interregional Highway Committee to the President and Congress in 1944. The system was selected with the aid of data from the state highway planning surveys of the last eight years.

Planning Surveys

Provision is made for the continuation of highway planning surveys, including economic investigation of projects for future construction, and for highway research. For this purpose not more than one and one-half

per cent of the Federal funds may be used, and must be matched by the states.

Among the miscellaneous provisions of the program is provision for the development of flight strips adjacent to public highways. Provision is made for a standard code approved by the state highway departments and the Commissioner of Public Roads relating to signs, signals and markings installed by any special authority on highways constructed with Federal Aid funds. *This is a significant step toward uniform traffic control devices.*

The Senate bill varies in several respects with HR 4915 previously approved by the House Roads Committee.

HR 4915

The House proposal authorizes a total of $500 million a year rather than $450 million. The House measure contains only one apportionment formula for the Federal Aid primary system, urban extensions and secondary roads. That formula is based on ½ population, ¼ area and ¼ post road mileage.

Under the House bill the Federal share of costs would be 60 per cent for the first year, and 50 per cent thereafter.

Judging by the serious attention given to the highway problem by House and Senate leaders and members, prospects are excellent for adoption of a forward-looking Federal Aid highway bill before the state legislatures meet early next year. Concern has been expressed over the fact that in many states both routine and new enabling legislation will have to be passed in order to match and meet Federal funds and requirements.

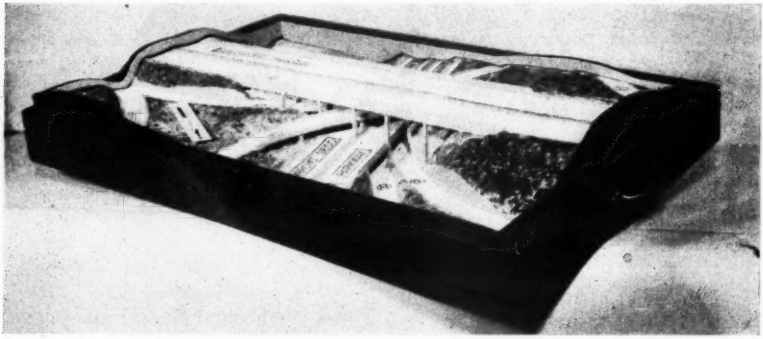
FOUR-LEVEL GRADE SEPARATION FOR LOS ANGELES PARKWAYS INTERSECTION

The intersection of the Hollywood Parkway and the Arroyo Seco-Harbor Parkway at the westerly fringe of the Los Angeles Civic Center area will be the most intensely used interchange point on the entire parkway network, since two of the most heavily traveled routes cross each other at a point in close proximity to the center of business and governmental activity in the city.

State Division of Highways engineers have developed an entirely new type of grade separation and interchange system as an outgrowth of studies of the requirements at this site. This new interchange system has been designated as a "Four-level grade separation" and embodies unusual features designed to increase safety, to reduce traffic confusion and to decrease travel distances for interchange traffic movements between Parkways.

The plan of the intersection clearly indicates that the method of handling exchange traffic between the two parkways is greatly simplified in comparison with the conventional types of interchange systems, as, for instance, the clover-leaf type in which the left turn is accomplished by means of a three-quarters or 270° loop to the right. In the clover-leaf type there is also an overlap of acceleration and deceleration traffic with resulting conflict and confusion. Other types of exchange systems employ reversing curvature and circuitous travel for some of the traffic movements, together with numerous bridge structures, all of which are detrimental to smooth and economical operation.

"California Highways and Public Works"—May-June, 1944—S. V. Cortelyou, District Engineer.



Model of four level grade separation, Los Angeles, California.

The four-level grade separation eliminates these objectionable features by providing a simple turn for all traffic movements, in the direction in which each wishes to go and without excess distance over that which would be required in ordinary highway travel. It will be noted that the take-off from one parkway and junction with the other is in all cases made on the right side of the parkways, which is considered desirable on express type roadways.

In the four-level grade separation the basic feature is that the four separate roadway levels are so arranged as to pass one another at one point in a single bridge structure. The two major parkways intersect one another at approximately a right angle and on different levels, while two pairs of interchange roadways occupy a level each in positions bisecting the quadrants made by the main parkway crossing.

The lowest level is for the two 26-foot one-way roadways which handle the connection from the Harbor-Arroyo Seco Parkway to the Hollywood Parkway. The second level is the Harbor-Arroyo Seco Parkway which is a six-lane freeway with central dividing strip. The third level is for the two 26-foot one-way roadways handling exchange from the Hollywood Parkway to the Harbor-Arroyo Seco Parkway. The fourth or highest level is the Hollywood Parkway, a six-lane freeway with a 34-foot central dividing strip.

The resulting bridge structure is 69 feet in height from the lowest roadway to the highest roadway, of which about 47 feet will extend above the natural ground surface.

Peruvian Highways — Peru, today, has over 15,700 miles of good highways. In 1927, it had 7,500 miles. The Pan-American highway runs for 1,751 miles through the length of Peru; nearly all of this is completed, and nearly 90% is either hard-surfaced or asphalted. An outstanding work and accomplishment of the Republic of Peru is the completion of the strategic Ocean-to-Amazon highway, which connects Peru's Pacific Coast ports with the upper Amazon Valley. This highway runs 522 miles from Lima to Pucallpa.

Automobile Damage and Man-Days Loss Due to Traffic Accidents

by HENRY K. EVANS

DURING 1944 the National Conservation Bureau has been conducting studies in two states and six key war centers to measure the amount of damage to automobiles and man-days loss from jobs, as a result of traffic accidents. The technique involved sending questionnaires through the mails to drivers, passengers, and pedestrians involved in accidents in order to ascertain their time losses from employment, damage to their automobiles, and other related factors. The studies were conducted jointly with the cooperation of the local traffic and safety authorities in each of the areas, which included Wilmington, Del., Schenectady, N. Y., Lansing, Mich., Providence, R. I., Omaha, Neb., State of Delaware and State of Connecticut.

On the basis of the reports thus obtained, I have estimated the nationwide impact for last year at 244,000 automobiles scrapped as a result of traffic accidents and 19 million man-days lost from jobs due to direct absences following these accidents.

Automobile Scrappage

The percentages of vehicles scrapped ran from a little over 3% in urban property damage accidents to 40% in fatal accidents. The accompanying illustration shows the average damage per automobile, totaling the results of our six studies. Note that in each case rural accidents were more severe than those in urban areas, probably because of higher speeds and less reporting of minor accidents in rural areas. *These studies involved only reported accidents.* In the areas studied there is compulsory reporting of all except property damage accidents of less than $25.00 and in several instances all property damage accidents including those below $25.00 are required to be reported.

According to the studies, two out of five cars in car occupant fatal accidents were scrapped, one out of every six in car occupant injury accidents was scrapped, and one out of 40 cars in property damage accidents was scrapped. This would mean one car out of 30 involved in all accidents was scrapped.

Applying these ratios to the nationwide accident totals gave an estimate of 244,000 automobiles lost last year. Comparing this to the ODT estimate of 1,250,000 automobiles scrapped last year due to all causes, it would indicate that one out of five automobiles in the junk yard was sent there because of a traffic accident. The other four then were relegated to the junk heap because of old age.

It might seem rather unimportant that only one out of five cars in the junk yard got there by accident. But remember that the one accidentally destroyed car is, on the average, a relatively new car, while the other four were old worn-out vehicles, junked because they were too old and unsafe to run any longer. In fact, cars being junked today are older and more decrepit on the average than ever before, because every effort is being made to keep every car running just as long as possible in the face of the unprecedented shortage of private transportation facilities.

The author is Traffic Engineer, National Conservation Bureau, New York City, and Editor, TRAFFIC ENGINEERING Magazine

The accidentally destroyed vehicles on the other hand are probably representative of those being used today. A limited check in our studies of the year models scrapped supports this statement. Scrappage totals for the past few years support this statement that the 4 cars on this chart are older and more decrepit than ever before. According to the Office of Defense Transportation, the total scrappage during the three years preceding the war, 1939, 1940, and 1941, was 6 million vehicles. But during 1942, 1943, and 1944, the number of vehicles scrapped totals 3,750,000. This indicates a tightening up on scrappage. Thus, over 2 million vehicles are operating on our streets and highways that ordinarily would have been scrapped if new cars were available for replacement. It is obvious that many of these cars "living on borrowed time" are old vehicles that should be junked, and are apt to be unsafe, which can only mean added chances for accidents during the next few years.

Time Losses

One of the major findings in our surveys involved the hours lost by workers on account of traffic accidents. According to the reports received from pedestrians injured in traffic accidents, the average loss was 52 days per injured pedestrian. The average injured car passenger lost 27 days; the average injured driver lost 13 days; while the average uninjured driver lost ¾ of 1 day. The only person left out of this picture is the non-injured passenger. In all except one study it was impossible to obtain enough reports in this category to form a reliable sample. However, in the one study non-injured passengers' time losses averaged a little over 5 hours per person.

Reasons for Absence

In the cases of injured drivers, passengers, and pedestrians, the time losses were the result of confinement at home or in the hospital. However, drivers and passengers not injured reported a surprisingly high average of hours lost because of transportation disruption, need for taking care of automobile repairs, nervousness and shock, appearing in court and at the police station, and many other reasons. For instance, a turret lathe operator was involved in a property damage accident, where he wasn't hurt, but his car was laid up for repairs for a period of time. He had been working overtime every day, driving his own car to and from work, before the accident. While his car was being repaired, he had to curtail his working schedule to a normal 8-hour day in order to find a ride back and forth with someone else, hence he lost 96 hours which he normally would have put in at overtime.

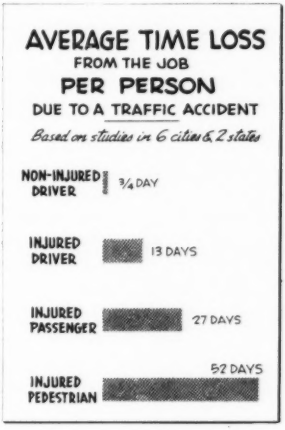
A supervisor of sub-assembly of time fuses reported that he could not get to work for 6 days because his car was in the repair shop, and he could not find any alternative means of transportation. A deckhand on an Army transport boat lost 56 hours—a grinder and inspector lost 80 hours—a roofer lost 40 hours—more examples of car owners forced to remain off the job because of no way to get to work while their cars were laid up for repair.

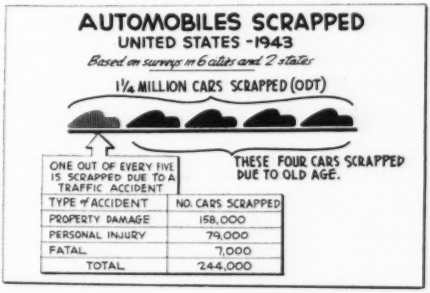
Some Other Findings

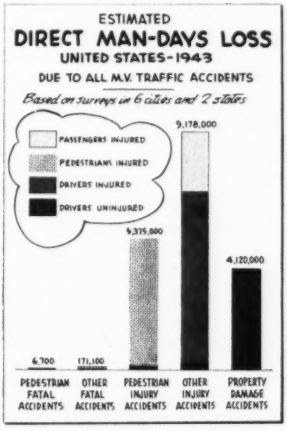
One of the questions asked involved the delay encountered by the car owner in obtaining repairs on his automobile. This was definitely a factor in the time losses from employment since many of the car owners cited repair difficulties as their sole reason for staying away from the job. The percentage of car owners seeking repairs who were delayed ran from a low of 42% in Lansing, Michigan, to a high of 66% in Delaware. Reasons given for these delays were about

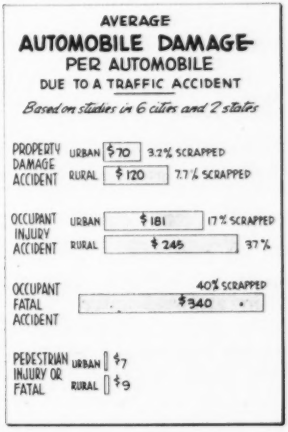
NATIONAL LOSSES

BASED ON STUDIES BY NATIONAL CONSERVATION BUREAU




AUTOMOBILES SCRAPPED
UNITED STATES - 1943
Based on surveys in 6 cities and 2 states
1 1/4 MILLION CARS SCRAPPED (ODT)
ONE OUT OF EVERY FIVE IS SCRAPPED DUE TO A TRAFFIC ACCIDENT
THESE FOUR CARS SCRAPPED DUE TO OLD AGE.
TYPE of ACCIDENT
NO. CARS SCRAPPED
PROPERTY DAMAGE 158,000
PERSONAL INJURY 79,000
FATAL 7,000
TOTAL 244,000





evenly divided between shortages of parts and mechanics.

In estimating the overall man-days loss from industries it was necessary to ascertain what percentage of drivers, passengers, and pedestrians in accidents were actually employed. It was found that 90% of drivers were employed, 75% of passengers and 50% of pedestrians. In war production work alone there were 65% of the drivers, 55% of the passengers, and 35% of the pedestrians.

Conclusion

With the military events that have taken place this year, it is safe to say that the spotlight has been shifted away somewhat from the critical manpower shortages that were interfering with maximum war production. Production of war goods is leveling off and the general feeling is that we have passed the critical point in our war effort. So the time losses to war production may be becoming less important than previously.

Twenty or 30 million man-days loss from industries in 1945 may not mean as much as the same loss in 1943.

However, the economic losses to industry through motor vehicle traffic accidents definitely are not becoming less important. We know that as automobile traffic volumes begin to come back to prewar levels, and accidents continue to rise, that this will mean an increasing economic loss to industry.

In the post-war era when war production is no longer a factor, these millions of man-days loss due to motor vehicle traffic accidents will mean monetary losses to industry which they cannot afford to overlook. There isn't room here to list the many different origins of costs paid by industry when a traffic accident occurs — unearned salaries paid accident victims, cost of training replacement workers, cost of overhead while the employee is laid up, and many others.

It will be a period of 3 to 6 years or maybe even longer before the automobile manufacturers have satisfied the pent-up demand for cars, and the average age of the car on the street is back to the pre-war level of about 4½ years. Today's average is 7½ years.

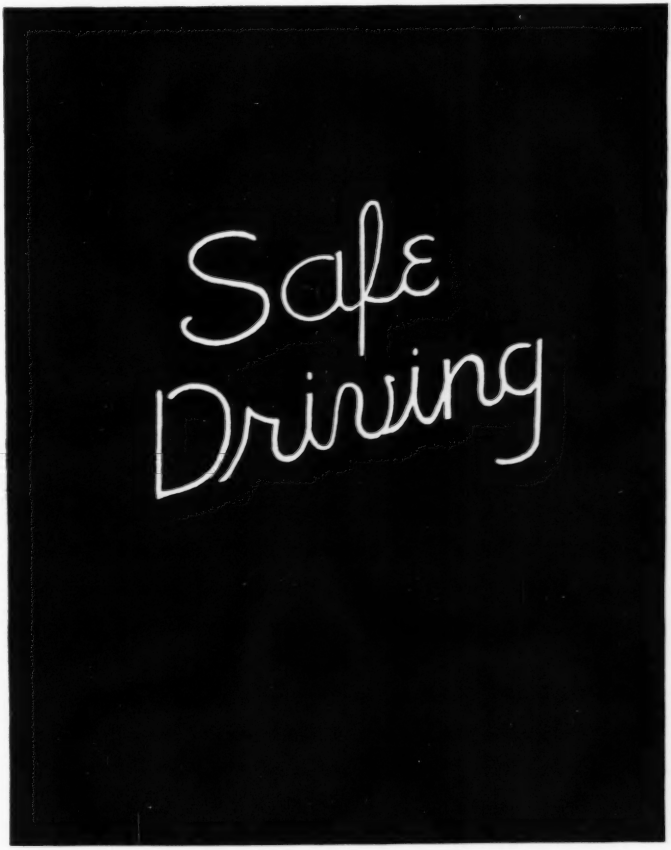
I can see two intervals in this 3 to 6 year period. During the first interval, that is, the next couple of years —we will have an increasing number of old cars, which will certainly add to the existing hazards, especially as driving restrictions are eased.

The second interval will start with the manufacture and release of new cars in quantity on our streets and highways. During this second, more hazardous period, the new speedy cars will be mixing with the old jalopies left over from pre-war days — like those two million that are now living on borrowed time. This can only lead to more accidents, either because of the differentials in speed, or because the old car owners will try to keep up with the faster new cars.

These factors mean only one thing to industry—more and more money paid out because of traffic accidents involving employees. The more that those in the traffic safety field can find out about the relation of traffic accidents to industrial losses, the more we can expect the cooperation of industry in helping to reduce traffic accidents to a minimum.

Rural Fatalities—Between 1924 and the Jap attack on Pearl Harbor rural traffic deaths increased 106 per cent while urban fatalities rose only 3 per cent—evidence that much traffic has moved into the country in 20 years. In the eight years (1930-38) rural pedestrian fatalities increased 43 per cent, while non-pedestrian fatalities increased 8 per cent.

PRISMO "LIFELINE"



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HUNTINGDON PENNA.

Providence Modernizes Its Public Transit System

by WILLIAM B. SPENCER

WHY has the management of the United Electric Railways so consistently expanded the trackless trolley system of Providence and Pawtucket, replacing street cars and, in some cases motor bus routes, with a relatively new type of transit vehicle?

Many factors entered into their decision, but the most important has been the sound and hard-headed financial reason — more passengers and greater revenue per mile of operation through both depression and boom-time war years.

Ever since the United Electric Railways opened its first experimental trackless trolley route in Pawtucket on December 26, 1931, trackless trolley operations, in revenue passengers per mile, have been well ahead of the system average, year after year, as the trackless trolley system was expanded. For the past three years the passenger per mile figure is better than 20 per cent more than the system ratio.

Starting in December 1931, with five trackless trolleys operating over 5.3 miles of route, the United Electric Railways trackless trolley system has grown today to 204 coaches with many more on order. We do not hesitate to say that we are awaiting the end of the war to continue our original plan of replacing most of the street car lines in Providence with trackless trolleys.

From the very start, the Providence - Pawtucket trackless trolley routes have been successful in obtaining and holding new passengers. With such contributing factors such as novelty riding, loss of revenue on other lines and consolidation of routes entirely discounted, the United Electric Railways statistics indicate that the trackless trolleys compared to the system trend, have contributed a minimum of 10 per cent of passengers to the transit-riding public of the system, and at times as great as 33 per cent increase.

While this increased passenger load may be more of a headache than an advantage in Providence today, where transit riding in January 1943 showed an increase of 65.66 per cent over 1942, the trackless trolley chart showed up favorably in times that were not as favorable or profitable.

This margin in favor of the trackless trolley as a popular transit vehicle has brought in well over $1,000,000.00 in extra fares over the eleven years of operation. When this plus business is combined with the factors of long service life—all the original coaches are still in operation—and of low maintenance costs, the operating cost ratio to their revenue is even further reduced.

Operating conditions in the Providence metropolitan area are difficult these days, with the tremendous loads to be transported to the war - busy manufacturing plants and shipyards. ODT has helped ease the pressure by permitting the delivery of 35 new 44-passenger coaches in 1942 and 20 in 1943, as well as a number of motor buses.

The author of this article is Traffic Manager of the United Electric Railways Co., Providence, R. I.

By herculean efforts of the maintenance department, out-of-service time of all rolling stock has been kept at an absolute minimum and during peak hours the yards and garages are virtually bare of equipment. Practically no spare ratio on trackless trolleys is maintained during the afternoon peak, and throughout the severest winter in many years, trackless trolley out-of-service average was practically nil.

Trackless Trolley Mobility

While the trackless trolley is not as mobile as the motor coach, it is sufficiently more mobile than a street car to be capable of avoiding many delays to the latter caused by obstructions. Due to its rapid acceleration and deceleration, higher scheduled speeds can be accomplished in the same service as compared with either the street car or the motor coach.

When street cars operated on our inter-city Providence-Pawtucket line, 15 was the maximum number used and they produced 1,870 miles per day. When trackless trolleys were substituted 16 was the maximum number of vehicles and they produced 1,924 miles per day. While the motor buses were in service 21 were required, an increase of 5 over trackless trolleys.

Comparative Costs

We find that in comparable service trackless trolleys operate 3c per mile cheaper than motor buses and 5c to 6c per mile cheaper than street cars, if the power is purchased. One hundred and seven of our 204 vehicles are 44-passenger capacity with dynamic and regenerative braking.

Operating all three types of surface transportation, our comparative figures are interesting. Maintenance costs for the year 1942 for labor and material only was 3.23c for street cars; 2.00c for motor buses and 1.12c for trackless trolleys. Trolley wire maintenance was 0.76c per mile. Depreciation is on a basis of 10 years for trackless trolleys, 6 years for motor buses, and 20 years for street cars.

Speed and Power

Trackless trolleys produce at least 10 per cent more speed in a given service than the motor bus or the street car and for the year 1943 the actual scheduled speed, minus layover, was 10.85 miles per hour. This compares

Pullman 44-passenger trolley coach equipped with G-E motor placed in service recently by the United Electric Railways Company in Providence and Pawtucket, Rhode Island.

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NORWALK, CONN. CHICAGO, ILL.

with 8.98 miles per hour for street cars in comparable service. Trackless trolleys accelerate to 20 miles per hour in 9 seconds or 3.75 miles per hour per second. Power consumption is economical with 3.50 K.W.H. AC per mile as compared with 6.11 K.W.H. for street cars.

The overhead wire structure is inconspicuous. Grooved cadmium copper wire is used with carbon insert shoes on the coaches. There is no noise. The life of the wire through the use of carbon insert shoes appears to be indefinite. We started one of our major lines, which serves a gigantic shipyard, in 1940 and inspection of the wire in June 1944 showed no wear.

For the year 1943 trackless trolleys earned 57.97c per mile, motor buses 38.76c and street cars 58.82c. In general trackless trolleys operated 6c per mile cheaper than street cars and 3c per mile cheaper than motor buses.

During snow and icy weather, trackless trolleys are considered as giving a better performance than do motor coaches and a far better performance than street cars. On a snow base there is good traction and braking conditions. Icy roads produce the most trouble. All of our routes are sanded and hills are given special attention. All motor buses and trackless trolleys are equipped with sanders, which drop sand under the rear wheels.

Trackless trolleys operate just about twice the mileage per accident as compared with the street car.

The Public's Desires

In our case there is no question whatsoever as to the trackless trolley being the one vehicle which the public accepts, likes, and patronizes liberally in mass transportation service. It is one thing to foist on the public something they are not looking for, but it is quite another thing to give the public something which they accept with open arms. Many companies nearly went into receivership owing to private automobile competition. It can still happen after the war.

In 1943 on our property trackless trolleys carried 10.05 passengers per mile as compared with 10.25 per mile for street cars. So far it is the only transportation vehicle, which the public has accepted with deep satisfaction and actual enthusiasm.

The modern trackless trolley can successfully supplant and give superior service on the heaviest mass haul trolley lines existing on our property.

HOW THE PROVIDENCE TRACKLESS TROLLEY ROUTES GREW

Their Passengers and Mileage Through the Years and Passenger-Per Mile Record Compared with the Entire System

	Trackless Trolley Revenue Passengers	Trackless Trolley Mileage	Trackless Trolley Passengers Per Mile	Entire System Passengers Per Mile
1932	1,519,973	238,774	6.37	6.35
1933	2,205,121	334,033	6.60	6.07
1934	5,409,963	843,619	6.41	6.10
1935	9,724,772	1,495,438	6.50	5.86
1936	16,822,588	2,476,257	6.79	5.96
1937	20,475,681	3,085,435	6.64	5.73
1938	19,200,639	2,979,078	6.45	5.56
1939	19,630,669	2,935,348	6.69	5.65
1940	23,187,200	3,363,531	6.89	5.75
1941	33,817,945	4,297,819	7.87	6.24
1942	48,851,896	5,298,048	9.22	7.53
1943	61,859,792	6,167,285	10.00	8.37

Alcan Highway— Opinion seems to have it that 1800 miles of this war-built highway through Canada to Alaska will not have much post-war value for tourist travel. It is highly questionable according to one source of information whether the Canadian government (to whom the highway will revert six months after the war) can afford the maintenance of a road through the wild and isolated country it traverses.

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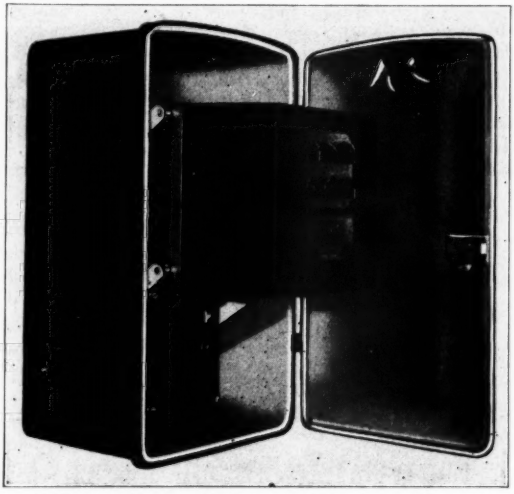
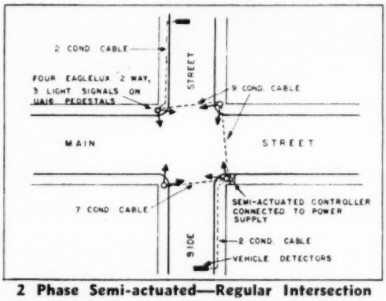
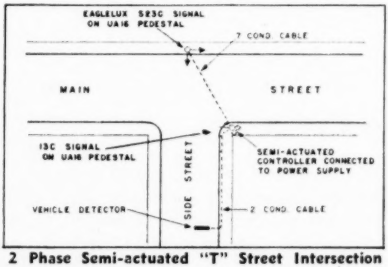




2 Phase Semi-actuated—Regular Intersection



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Signs and Signals Maintenance Eliminates Accidents

by W. L. Potts

The prime function of a traffic control device must be *the conveyance of an intelligible message to the person concerned*. A safe rule to apply in this connection may well be that old quotation, *that he who runs may read*. Assuming that the original legend on a sign, for instance, meets this requirement, the directing agency is then faced with the responsibility of maintaining the legend in all its pristine efficiency. Today, with the emphasis in every city upon accident prevention as a contribution to our national war effort through the preservation of essential transportation, many cities are overlooking the connection between poorly maintained traffic control devices and a continuing high vehicular and pedestrian accident rate in spite of a generally restricted use of private motor vehicles.

Maintenance vs. Accidents

This statement is amply substantiated by the records developed by our traffic research activities from studies of police accident records in many Michigan cities covering thousands of intersections both controlled and uncontrolled. The records of the last seven Michigan cities studied show a definite relationship between poorly designed traffic installations and accident experience.

In connection with the relationship between stop sign faults and traffic accidents at intersections controlled in this manner, we were not satisfied to abide solely by the accident records but conducted a series of "obedience" checks. Our studies indicate a very definite correlation between sign legibility on the one hand and the obedience rate and the accident rate on the other.

The guardianship of the public welfare places a definite responsibility for the proper maintenance of all traffic lights and signs and all other media of traffic control or direction at the peak of efficiency. Our studies have shown however that this responsibility is not always appreciated since we have found traffic signal lights operating at but 20 per cent of the possible light output due solely to lack of periodical cleaning. Not infrequently we have found signs, signals and markings properly located and maintained on the more important routes through a city and deplorably inefficient on other streets.

Certainly if traffic at an intersection anywhere warrants the installation of a traffic signal; then such signal warrants proper maintenance, lest this medium, originally installed for greater safety and efficiency actually introduce additional hazards. Equally important to proper maintenance is the proper positioning of traffic lights and signs. A safe rule for the installation of any sign or signal is contained in the *Manual for Uniform Traffic Control Devices*.

Many locations studied by our organization, in different cities, were found to show a high accident frequency caused solely by improper positioning of traffic control devices.

The author is Traffic Engineer of the Automobile Club of Michigan.

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High intensity reflection at long range. Extreme angularity without loss of reflecting power. They remain visible almost up to the point of passing by the vehicle. Housings are of rugged construction, durably finished.

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The Grotelite Co., Inc.

Bellevue, Kentucky

When changes were effected to bring the control device into conformity with standard practice a gratifying reduction in accidents invariably followed.

Common Mistakes

Referring again to maintenance of traffic signals and signs, it might be well to enumerate a few of the more common conditions found to obtain almost universally.

1. Improper light bulbs in the traffic signal head. It is not at all uncommon to find 50 or 60 watt house type lamps in signals and in some cases even frosted bulbs were discovered. The resultant loss in light efficiency was often found to reach 50 per cent. It is suggested that efficiency and safety in traffic would be served by the adoption of standard specifications relative to signal lamps.

2. Obscuration of lenses by accumulations of dirt. This is especially likely to occur in any industrial location and particularly where there is any discharge of chemical fumes into the air. The ultimate result of neglect in this matter is a change in the form of the light indication to the motorist and a continual lessening of the effective warning distance of the signal. An instance: Weston meter tests of the light output of the traffic signals as being operated gave a reading of twenty. A second reading taken after a thorough cleansing of lens, reflector and lamp bulb, was 100. Regarding the change in shape of the light indication — the shape does change with dirt accumulation until the light indication is in the shape of a crescent instead of a disc. We have found signals that when viewed through a number one Grayscale plate showed a crescent shaped indication but one-third the diameter of the lens at the widest part. In the city just cited, the traffic director reported a 62 per cent reduction in rear-end collisions at traffic signal controlled intersections in the year following the adoption of a consistent program of traffic light cleansing.

3. Sub-standard lenses and reflectors —this is, of course, a matter than can be corrected only by replacement and must of necessity wait upon the return of more normal conditions.

Stop Sign Faults

The two principal faults of stop signs; faults that encourage disobedience on the part of the motorists and consequently increase the accident potentiality of a given intersection are disfigurement and improper positioning in relation to the needs of traffic. It is obvious that the correction of these faults is a relatively simple matter. This condition is likely to continue however until there is a general adoption of and insistence upon adherence to a standard of installation and maintenance of stop signs. It is suggested that the angle of tangency of the sign face be determined in relation to driver position rather than from the curb or sidewalk line as is sometimes done. Where signs are disfigured or faded to the point where they are partially illegible, renewal is indicated.

To enforcement officers, properly placed and maintained signal control devices are essentially working tools of the profession. Inasmuch as practically all traffic cases are tried in equity rather than law, poor traffic light position or indication, and illegible or partly hidden or nonexistent stop signs offer large loopholes in any enforcement program, permitting even wilful and dangerous violators to evade their responsibility.

There is a definite psychological effect upon the driver stemming from the condition of traffic control media. The driver invariably attaches importance to those signs and signals that impinge upon his consciousness, and is co-operative. Conversely he

may assume (and reasonably so) that relatively little importance is attached to a location guarded by a dilapidated sign or ineffective signal, and in consequence pays little attention to the same. By this action he develops habits that soonor or later are reflected in the accident records.

In conclusion it may be stated that with conservation the keynote, it is imperative that all forms of traffic control be keyed to local needs in terms of present conditions. All inanimate traffic control media should be measured against the yardstick of efficient traffic operation, i.e., the greatest possible conservation of automative equipment through the elimination of many accident causes. Adequate maintenance of all necessary signal control devices and the elimination of all unnecessary ones should be a matter of first priority.

Recreational Areas and Limited Access Highways

by JOHN S. WORLEY
and
GEORGE W. MCCORDIC

IT IS but a brief period of time since industrial areas were small in size with their perimeters sharply outlined. These areas consisted frequently of a single municipality, such as Milwaukee, Wisconsin, or Providence, Rhode Island, which sometimes would include one or two surrounding villages. Articles of manufacture were fabricated from the raw material to the finished product in one of these areas and the employee lived within a short distance from his place of employment. Due to specialization in manufacturing and improvement in our transportation facilities this is no longer true. The manufacture of a finished product now consists of processing and assembling various parts in a number of factories specially equipped for doing a particular thing, which factories may be located many miles apart and the employee is no longer found living near his place of employment, his home now being in a community of his choice from a few miles to as much as 30 or 40 miles away. The development of the city of Detroit and the surrounding area as a place of industrial activity is a splendid example.

Mr. Worley is Professor of Transportation Engineering, University of Michigan. Mr. McCordic is Engineer-Director, Huron-Clinton Metropolitan Authority.

Recreation Area

Recreation in general may be said to be the process and have as its objective the restoration of the human being from mental and physical fatigue. It is considered play frequently. The rehabilitation may take place through absolute rest, detraction of mind to new and interesting subjects, or entertainment of a general nature, which is psychological, or it may consist of physical exercise. In all instances it is dissimilar and has little or no relation to one's daily tasks. It is a detraction from what may have become boresome. In some cases the rehabilitation may take place through the actual performance of useful work as the growing of a victory garden.

The methods of the modern industrial plant, with its assembly lines and efficient production planning, where employees are engaged continuously in doing a single thing, hour after hour and day after day, with no diversion

in work, result in ennui to the employee. Reduction in individual efficiency is of importance to the industrialist and may affect the worker's health both mentally and physically. Even though the production planning is so perfect that a drop in the efficiency of the individual affects manufacturing economy but little, the worker's health is still of great importance to the community.

Sociologists and others who have made extensive studies of this subject claim that the lack of recreation facilities in our industrial centers frequently is the cause of social antagonisms which result in discord and sometimes leads to social disturbances. An example of this is the recent race riots in Detroit, which resulted in the death of 32 persons, the injury of many others, and the destruction of property of large value.

The paucity of recreational areas in Detroit and its immediate vicinity, when compared with other communities, is strongly emphasized, as shown in the following:

Park Acreage per Thousand Population in Metropolitan Regions— Chicago, 12.12; New York, 10.91; Cleveland, 10.02; Boston, 8.69; Cincinnati, 8.56; Buffalo, 6.25; Detroit, 2.65.

Percentage of Park Area in Metropolitan Regions—Boston, 6.6; Cleveland, 4.2; New York, 3.8; Cincinnati, 2.1; Chicago, 1.3; Buffalo, 0.8; Detroit, 0.3.

"There are no cut and dried standards for determining the necessary acreage of parks in proportion to population. Authorities agree, however, that for every 100 residents there should be at least one acre in city parks and playgrounds and another acre in county and metropolitan parks. In addition to these parks intended for intensive use, a larger acreage of wilder type of land is needed within reasonable reach of the people. Such lands should be suited to a wide variety of recreational uses, including hunting and fishing — a combination of hills and waters, woodland, and open spaces —where natural beauty can be enjoyed and preserved without crowding.

"In the 25 largest cities of Southeastern Michigan are approximately 8,000 acres in city parks. According to the standards mentioned, and considering the population, these should be at least 24,000 acres. County and metropolitan parks in this region aggregate 4,000 acres, whereas the standards of park authorities would require at least 35,000 acres."

The Cost

It would seem reasonable to assume that no one will dispute the benefit of recreation and particularly to the industrial worker. These benefits can be said to be in a direct proportion to the funds which are expended therefor. Unfortunately in planning recreational areas the benefits cannot be evaluated as are those of a private business enterprise. They are of an intangible nature not subject to determination. In the degree that we fail to invest in recreational facilities and pay an annual cost of operations below a certain floor level will society as a whole, the industrial worker, and the industrialist suffer and likewise just in the degree that we make investments and incur an annual cost above a certain ceiling will our expenditures be unwise and extravagant. The benefits of recreation not being susceptible to precise determination, complicates our problem.

Governor Kelly in his official and formal statement with reference to post-war public works, has the following to say on this subject:

"Public improvements for a post-war program should be based entirely upon the need and the proof of need can be well established when local governing agencies decide to furnish the

A GUIDE POST IN PLANNING TOMORROW'S HIGHWAYS
TUTHILL HY-WAY GUARD
The Spring Cushions the Shock
TUTHILL Guard Rails have these unique features:
1. Convex, deflective surface.
2. Strong steel springs to resist impact.
3. High visibility, greater safety.
4. Low mounting of brackets.
5. Standard lengths, easy installation.
In making plans for post-war highway construction, be sure to include TUTHILL, the safer Guard Rail. Its high visibility warns motorists. Its convex surface deflects cars or trucks. Its spring-like action absorbs shocks, lessens damage, lowers upkeep. Why be without these definite TUTHILL advantages?
Pacific Coast Manufacturers and Distributors
U. S. SPRING & BUMPER CO.
Los Angeles, Cal.
Special Notice!
TUTHILL Guard Rails are now available!
REQUEST DETAILS
TUTHILL SPRING COMPANY
764 POLK ST... CHICAGO 7, ILL.

funds necessary for the improvements."

The foregoing should be accepted as a controlling principle in all public improvement planning, whether it be post-war or other.

Southeastern Michigan Highways

Industrial workers will have frequently to travel considerable distances to reach interurban recreational areas. Many of them at the present time live in villages which are a considerable distance from their places of employment. The centers of manufacture of our Southeastern Michigan industrial area are frequently many miles apart. In all of the above instances it is desirable that passage be made with the greatest amount of safety in the minimum length of time, to accomplish which, as a rule, would require limited access highways. At this time these services are being rendered by our street and road pattern, which, excepting for the Detroit Industrial-Willow-Run Expressway, which is now under construction, and the one mile of Davison Avenue depressed highway in Highland Park, there is not another single mile of limited access highway in the area.

In light of the increasing specialized use such as reaching recreational areas, travel from home to the place of employment, traffic between centers of manufacture and general traffic both passenger and freight it would appear that a considerable mileage of limited access highways will be needed in Southeastern Michigan. Within our municipalities, limited access highways are needed greatly for facility of traffic, an example being the proposed McGraw-Harper Expressway across Detroit.

There remains one other important subject to which attention is called regarding recreational facilities for the industrial worker and limited access highways to serve these recreational areas and for other needed purposes and that is the administration of these undertakings from their inception, through the planning and construction stages, and their operation.

From the standpoint of harmony, efficiency, and non-discriminatory administration, it would appear that an over-all commission or authority should be created which would have authority in matters of policy.

UNIQUE PEDESTRIAN ISLAND DESIGN

Mr. Gordon R. Garvey, Chairman of the Committee on Roads, Bridges and Engineering of the County of Camden, New Jersey, announced recently the completion of the pedestrian islands at the intersection of Broadway and Monmouth Streets, in the City of Gloucester, N. J.

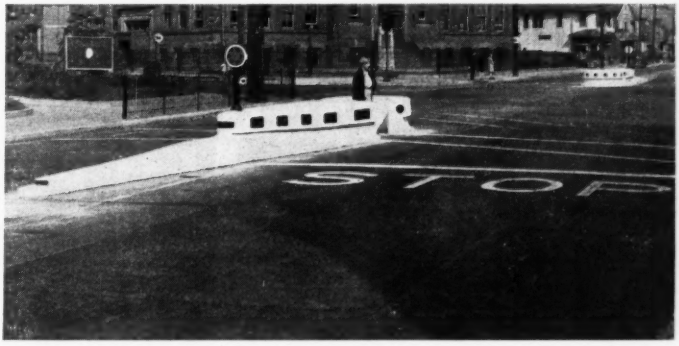
The islands are of a unique design, giving the pedestian positive protection in the center of the street and offering to the motorists a minimum of danger through collision with same.

The pedestrian walks through the rather massive island and is protected when standing therein by a concrete bulkhead either side of him. The motorist approaching the intersection is gently guided away from the concrete bulkhead by a long approach section, slanting so as to guide the cars which should accidentally strike same, back on to the roadway.

To provide adequate visibility, the island has been constructed of white concrete, generously inset with reflectors. The wells around the reflectors have been painted black.

Since this particular intersection is off-set, it was necessary in order to provide for the left turn, to set the islands back quite a bit in Broadway from the curb lines of Monmouth Street. In order that pedestrians might be guided to a safe crossing, an iron fence was erected on two corners, blocking off the old crosswalks and guiding the pedestrians to the new.

The islands were designed by the County Engineer, S. Herbert Taylor, and constructed under the supervision of Furman W. Shaw, Bridge Engineer, by the County Bridge Department.



COUNTIES Solve
Traffic Problems With

Traficounter

The Traficounter is used by scores of county highway departments throughout the country. Here is a typical comment, from the office of a county highway engineer regarding the excellent use being made of these precision built instruments.

"We have four Traficounters and find that they are a great help in getting continuous traffic count of certain sections of road. Our County road system is surfaced largely with pit run gravel and we have now reached a stage where—in our Post-War construction—we will have to do considerable regrading and bituminous surfacing.

"Traffic counts taken before gasoline rationing are proving valuable in determining what roads should be included in this program from a traffic standpoint."

This "lightning fast" automatic counter of motor traffic consists essentially of an electric counter and recorder which registers the count of cars that pass the detector. **Streeter-Amet Company, 4101 Ravenswood Avenue, Chicago 13, Illinois.**

STREETER-AMET

When writing to advertisers, please mention TRAFFIC ENGINEERING

ITE NEWS AND PERSONALS

1945 Annual Meeting

"Shall we change the location and date of the 1945 annual I.T.E. meeting?" This is one of the questions now being asked Institute members by a special news-letter questionnaire just sent out by Secretary Smith. The purpose is to help in planning the 1945 annual meeting, and may result in breaking away from the traditional joint-meeting with the National Safety Congress.

1944-45 I.T.E. Committees

Announcement will be made in the next issue regarding Committee Chairmen for the new year.

Meanwhile, Institute members have been afforded opportunity to indicate their preferences concerning on which Committee they desire to serve, by a questionnaire sent out by Secretary Smith. Those desiring to indicate preference are urged to complete and return immediately these questionnaires to the Institute Secretary.

Damon Heads Circulation

All future promotion of circulation of TRAFFIC ENGINEERING will be in the hands of Norman Damon (Affil.), Automotive Safety Foundation, whose appointment as circulation manager was recently confirmed by the Institute Board of Direction.

Damon announces that his first activity will be to initiate a circulation campaign, news of which will appear in the next issue of this magazine.

Institute History Being Compiled

William B. Powell, Member, I.T.E., is engaged in preparing a history of the inception of the traffic engineering profession, at the direction of the Institute of Traffic Engineers Board of Direction.

Accordingly, all Institute members as well as others having knowledge of the profession are asked to do the following:

1. Send to Wilbur S. Smith, Secretary of the INSTITUTE, 317 Strathcona Hall, New Haven 11, Connecticut, as complete a digest as you can recall of your personal activities in traffic engineering when you first began practice, noting particularly dates of engagements, conferences, meetings, developments of devices and techniques, together with any illustrative material, such as, pictures, plans, forms, and records. Do not permit modesty to restrict your report of accomplishment, but give us as much detail as you can, with the assurance that it will be held in confidence and will not be used directly without your permission.

2. Include with the above recollections the names of any other persons outside of the membership of the IN-

STITUTE whom you know have contributed to the formulation of the profession during its embryonic days, so that their contributions may be procured, also.

MEMBERSHIP APPLICATIONS

Applications received from September 11 to October 15 are as follows:

For Admission

Merton E. Ridge, Assistant Safety Director, U. S. Engineer Department, Manhattan District, Oak Ridge, Tennessee.

Frederick Taylor, Traffic Engineer, Oregon Shipbuilding Corp. and Kaiser Co., Inc., Portland, Oregon.

William Greene, Director, Connecticut Highway Safety Commission.

For Transfer in Grade

Wallace Braun, Traffic Engineer, Baltimore, Maryland.

Matthew Sielski, Assistant Director, Safety and Traffic Engineering Department, Chicago Motor Club.

National Traffic Training Institute

Oregon State College, Corvallis, Oregon, will be the location of the next National Institute for Traffic Training which will be held March 19-30, 1945.

Copies of Report Available

A limited number of copies of the report "War Worker Transportation" are still available for distribution. This 145-page printed report to the Institute of Traffic Engineers, by Theodore M. Matson, Director of the Yale Bureau for Street Traffic Research, covers every phase of employee transportation, and illustrates basic considerations which point to peace-time needs in the efficient and safe handling of employee transportation.

Requests should be addressed to the Institute Secretary, Wilbur Smith, Institute of Traffic Engineers, 60 John Street, New York 7, N. Y.

PERSONALS

Eugene Barton (Assoc.), since the middle of March, has been Chief of the Safety and Industrial Health Unit, Office of the Chief of Transportation, Army Service Forces. Gene reports that he has visited all major establishments of the Transportation Corps in the U. S., developing safety and health training programs and materials.

Giles Robertson (Assoc.), formerly Safety Engineer of the Virginia Department of Highways, has purchased an interest in a capital stock agency and entered the general insurance business in Richmond.

Miller McClintock (Mem.), president of the Mutual Broadcasting System, has announced that he will retire from that post at the termination of his present contract which will expire before the end of the year.

Major T. D. Lewis (Assoc.), reports from overseas that he is "back in the traffic racket again." He is now with the 6690 Regulating Co., APO 512, New York City. Formerly, Lewis was in the Signal Corps in Italy.

Lt. Robert Grunow (Assoc.), on leave from the Public Roads Administration, writes from overseas:

> "Have been meaning to write a few lines for some time as I appreciate receiving my copies of TRAFFIC ENGINEERING regularly, as well as other matters pertaining to the Institute. My outfit has been in France now for some time and since our arrival we have been clearing rubble from the docks and building ship berths. Things were sure in a mess and still are, but some progress can be seen. Our assignment will be completed soon and I hope then we move inland to see some more of the country. Have a little difficulty in getting along with the local gentry due to my lack of conversing in French. However, I seem to get by with what few words and phrases I do know. Traffic problems over here are not difficult; 99½ percent of the traffic is military and going one way (Fast) bumper to bumper. The war news surely looks good and we should be home before another year is out. Won't make this year's annual meeting but surely will in '45. Give my regards to my friends in the I.T.E."

William C. Brandes (Mem.), formerly with the Dallas, Texas, ODT office, is now City Traffic Engineer of Dallas.

Major Edward G. Wetzel (Assoc.), writes from overseas:

"Colonel Bud Yost holds a responsible position in control and operation of supply and personnel movements by motor transport to Armies.

"Captain Gordon Gravelle heads up a TE branch in another headquarters and is busy developing traffic circulation plans, etc.

"Lt. Wally Gove with an Army is really in his glory as any Traffic Engineer would be, having an opportunity to design and construct traffic facilities such as by-passes and circles (or roundabouts) and laying out traffic circulation net to eliminate traffic bottlenecks. He will leave many monuments to his ability and, from my observation, can justly be proud of them.

"Lt. Bill Jones was busy handling convoy movements in UK a couple of months ago and though I have not seen him since, presume he is over here now probably busy in some phase of the tremendous traffic problems.

"Lt. Ernie Perkins, Lt. Steve Butterfield and others I'm sure are here somewhere but have not heard of their whereabouts or the work they are engaged in.

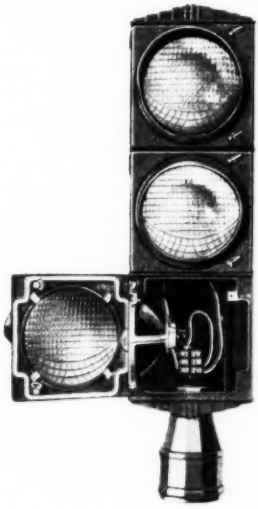
"Perhaps I might mention that as for myself I am engaged in watching the overall picture of Highway Transportation and recommending policies and procedures as necessary to assure that our Armies get what they need when they need it. Ellis Mathes TE for State of Idaho is my most able assistant.

"As a sidelight on the highway system here, you might be interested to know there is a splendid network of roads and they are holding up well under the continuous heavy traffic. Also, signs erected by National and Regional Auto Clubs, etc., (Burt Marsh to note) are quite a help to guide the drivers. The US system of signing is augmenting that already in place and I feel sure our traffic moves faster with greater safety as a result.

"Please give my personal regards to Ted Matson, Les Williams, Harold Hammond, Burt Marsh, Grant Mickle, Graham Cole and others. Best wishes to a successful year for TRAFFIC ENGINEERING and keep us over here posted on what's doing over there."

Burton Marsh, Roger Morrison, Grant Mickle and Harold Hammond (l. to r.) inspecting past presidents' certificates at annual I.T.E. Banquet in Chicago. Story appeared in October issue, TRAFFIC ENGINEERING.

TRAFFIC SIGNALS by CROUSE-HINDS



Type TSP113D

One Way
Post Type Signal

HOUSING: Sectional type of die cast aluminum construction with individual sections held between top and bottom plates by tie rods.

REFLECTOR: Extremely accurate polished glass or Alzak aluminum available. Reflector is mounted in cradle which also supports the lamp receptacle, and complete assembly is hinged to signal case.

RECEPTACLE: Adjustable type for correctly focusing lamps of 25 to 100 watts. Equipped with lamp grip to prevent lamp from loosening due to vibration.

LENSES: Designed to meet ITE specifications.

WIRING: Each signal is wired complete ready for installation. Color coded leads from each lamp receptacle are combined into a wiring form which extends to a connection block. Separate terminals for all field wires are provided on the connection block.

CROUSE-HINDS COMPANY
SYRACUSE 1, NEW YORK, U.S.A.

GO — CAUTION — STOP

Ohio T.E. Conference

To bring together engineering officials of municipalities and counties to discuss problems related to the safe, expeditious movement of post-war traffic, an Ohio Traffic Engineering Conference was held in Columbus Wednesday and Thursday, October 25 and 26, under the co-sponsorship of the Ohio Department of Highways, the Ohio Traffic Safety Council and the Ohio State Automobile Association.

The main theme of the Conference was that modern techniques in traffic engineering are essential to post-war traffic control and urban planning in view of the fact that, when present restrictions on motor vehicle use are removed, congestion and accidents on city streets and on rural routes linking large population centers will be without doubt even more of a critical problem than before the war.

Topics discussed at the Conference and the speakers were:

"The Facts about Traffic Accidents," NORMAN DAMON, Vice-President, Automotive Safety Foundation; "A Program for Post-War Traffic Safety," SIDNEY J. WILLIAMS, General Manager, National Safety Council; "Organization and Administration of a Traffic Engineering Department," D. GRANT MICKLE, Traffic Engineer, Automotive Safety Foundation; "Parking and Terminal Problems," BURTON W. MARSH, Director, Traffic Engineering and Safety Department, American Automobile Association; "The Post-War Pedestrian Problem," EARL J. REEDER, Chief Traffic Engineer, National Safety Council.

"Highway Planning Studies in Ohio," M. D. SHAFFER, Chief Engineer of Location and Right-of-Way, Ohio Department of Highways; "What Traffic Engineering Can Contribute to Street and Highway Planning," PROF. THEODORE M. MATSON, Director, Bureau for Street Traffic Research, Yale University; "Getting Results through Traffic Engineering," HAROLD F. HAMMOND, National Conservation Bureau; "Uniform Traffic Control Devices," HAROLD G. ECKHARDT, Assistant Traffic Engineer, Ohio Department of Highways; "Effect of Design on Highway Efficiency and Accidents," JOSEPH BARNETT, Chief, Urban Roads Division, Department of Design, Public Roads Administration.

A feature of the Conference program was a panel discussion on Ohio's post-war traffic problems, including parking, speed control, pedestrian safety, and signs and signals.

Hal G. Sours, Director, Ohio Department of Highways, delivered the address of welcome to the approximately 150 state, municipal and county officials attending the Conference.

Harry E. Neal, Chief Engineer, Division of Traffic & Safety, Ohio Department of Highways, was in charge of program arrangements.

Detroit Makes Traffic Survey

On Thursday, October 26, the Detroit Traffic Engineering Bureau conducted a thorough traffic survey in the central business district with the assistance of 150 police officers and 5,000 Boy Scouts.

The survey included a cordon count, a through-traffic study, involving the distribution of a card to each motorist entering the cordon and its collection when the motorist left the cordon, and a complete curb and off-street parking study which included data as to each driver's place of residence by postal zone, the place where he parked, his principal destination, and the primary reason for being downtown.

ATA Elects Officers

Announcement has been made of the election of Colonel Roane Waring as President of the American Transit Association, succeeding E. B. Merrill who served during the past year. Waring is President and General Counsel, the Memphis Street Railway Company, Memphis, Tennessee. Gordon Steele, President, Portland Traction Company, Portland, Oregon, was elected Vice-President and E. A. Tuson, General Auditor, Public Service Board, Coordinated Transport, Newark, New Jersey, was elected Treasurer.

Details are included in the American Transit Association publication, *Convention In Print*, just released, which includes many worthwhile papers dealing with transit.

A Limited Number of ANNUAL PROCEEDINGS for 1938, '39, and '40 Are Available.

Free single copies of each will be sent to Institute members upon request and payment of postage (10c per copy), as long as the supply lasts.

INSTITUTE ACTIVITIES TEN YEARS AGO

This is taken from the files of Traffic Engineering Magazine of 10 years ago, and reproduced here with the thought that our readers will find it of interest.—Editor.

The Fifth Annual I.T.E. Meeting in Cleveland on October 2-3, 1934, was well attended.

A number of technical papers were presented covering a wide range of subjects and many interesting points were raised in discussion. In the session devoted to pedestrian control, for example, Mr. Van Duzer and Mr. Stupka brought out the surprising fact that the accident injury rate for children both in Washington and in Philadelphia was about 3 times greater than that for adults, indicating that there is still room for improvement in child safety work.

Mr. Nachod's method for computing the proper length and division of the signal cycle gave evidence of considerable work and much careful thought.

During the open forum following the annual dinner, it was proposed that the Institute approve the standard of colors through signal lenses adopted by the American Standards Association.

The Board of Direction met—proposed a diploma as evidence of membership in the Institute—the Secretary was instructed to prepare a sample for the inspection and approval of members.

E. W. James, Jay C. Vincent and Norman D. Wilson were elected as full Members. Charles D. Clark, Charles F. Cunningham, Robert A. Mitchell, E. J. O'Meara, R. F. Riegelmeier, Wilbur Smith, and William H. Voltz were elected as Associate Members. Edward L. Cyr was elected a Junior Member.

W. F. Rosenwald transferred from Associate to full Member. Harold F. Hammond and Dwight M. McCracken transferred from Junior to Associate members.

The following were elected to office on October 2, 1934:

Lewis W. McIntyre, President.

Roger L. Morrison, Vice-President.

Maxwell N. Halsey, Director.

Burton W. Marsh, Director.

Signal Association Elects Officers

G. E. Wood, City Electrician, Houston, Texas, was elected president of the International Municipal Signal Association at its 49th Annual Meeting at Hotel Statler, Boston, October 2-5. Other officers elected were: John J. Alles, Wilkes-Barre, Pa., First Vice-President; Wm. F. Qualls, South Bend, Ind., Second Vice-President; Adin W. Chase, Niagara Falls, N. Y., Third Vice-President; Irvin Shulsinger, New York, N. Y., Secretary, and Charles S. Downs, Altoona, Pa., Treasurer.

The convention was one of the most successful in the long history of the Association, with an attendance of about 600 and a technical program covering all phases of municipal signaling work. Plans for the post-war development and extension of municipal signal systems in American cities were discussed and adopted.

It was voted to hold the next Annual Meeting in Chicago, probably the first week in October, 1945.

New Enforcement Publication

Announcement has been made of a new 300-page book *State Traffic Law Enforcement* for use primarily by state traffic enforcement officers in meeting problems of rural traffic. This was prepared as a joint project of the American Association of Motor Vehicle Administrators, the International Association of Chiefs of Police, and the National Safety Council, and may be purchased from the latter organization.

Statement of ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Traffic Engineering, published monthly at Plainfield, New Jersey, for October 1, 1944.

State of New York } ss.
County of New York }

Before me a Notary Public in and for the State and County aforesaid, personally appeared Henry K. Evans, who, having been duly sworn according to law, deposes and says that he is the editor of Traffic Engineering and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, to wit:

1. That the names and address of the publisher, editor, managing editor, and business managers are:

Publisher—Institute of Traffic Engineers, 400 Watchung Avenue, Plainfield, New Jersey; Editorial Office, 60 John Street, New York 7, New York.

Editor—Henry K. Evans, 60 John Street, New York 7, N. Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and address of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation the names and address of the individual owners must be given. If owned by a firm, company or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Institute of Traffic Engineers, 60 John Street, New York 7, New York.

Harold F. Hammond, President, 60 John Street, New York 7, New York.

Thomas J. Seburn, Vice-President, City Hall, Kansas City, Missouri.

Wilbur S. Smith, Secretary-Treasurer, Yale University, New Haven, Connecticut.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders, as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bone fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is .....
(This information is required from daily publications only.)

HENRY K. EVANS, Editor.

Sworn to and subscribed before me this 30th day of November, 1944.

JUNE McGRANE,
Notary Public, Queens County.

Queens Co. Clk's No. 1384, Reg. No. 29-Mc-5. Certificates Filed in N. Y. Co. Clk's No. 47, Reg. No. 38-Mc-5. Commission Expires March 30, 1945.

MARBELITE

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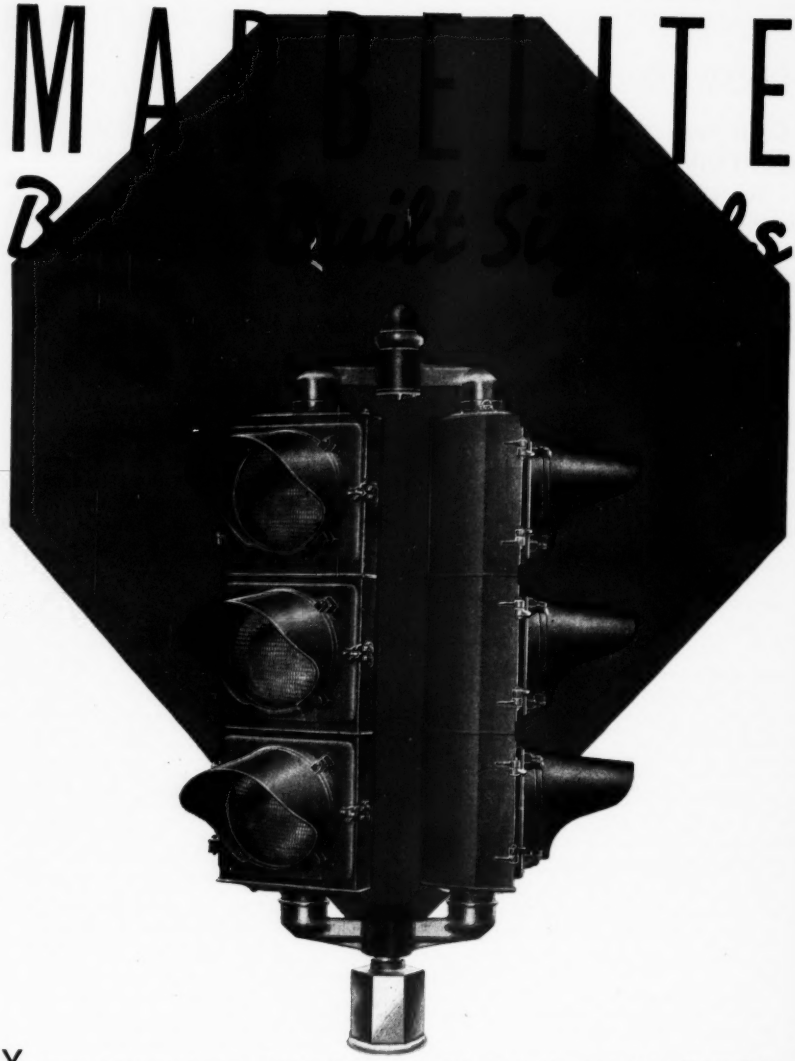

YOU can determine by just looking at this advanced design of a Two Way, Three-Color adjustable Signal that it is BETTER-BUILT.

Note the reinforced aluminum mounting brackets that replace the conventional pipe and fitting assembly. A compact, sturdy arrangement, eliminating small, minor parts.

You bet! It is BETTER-BUILT quality.

That isn't all, but it gives an idea of why Marbelite Signals are approved by numerous State and City Traffic Departments as well as Traffic Associations, and why there are so many thousands of Marbelite Signals in use in these Cities and States.

Familiarize yourself with other Marbelite features, such as the unbeatable optical unit. You will be proud to have such fine quality Signals regulating traffic in your community.

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